BIOLOGY YEAR 12 - MODULE 5 - LESSON 13

# Sources of Genetic Variation - Meiosis, Crossing Over, Fertilisation, Mutation

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

## 1. Key Ideas

Variation in offspring is not caused by a single process. Some variation comes from reshuffling existing alleles during meiosis and fertilisation, while mutation creates entirely new alleles.

- Major sources of genotype variation in sexually reproducing organisms.
- Why crossing over and independent assortment reshuffle existing alleles.

## 2. Success Criteria

By the end, you should be able to:

- Major sources of genotype variation in sexually reproducing organisms.
- That mutation is the source of new alleles.
- Why crossing over and independent assortment reshuffle existing alleles.

## 3. Key Terms

**Genetic variation**
Differences in genetic makeup within or between individuals of a population.

**Crossing over**
Exchange of corresponding chromosome segments between homologous chromosomes during meiosis.

**Independent assortment**
Random orientation and separation of homologous chromosomes in meiosis.

**Random fertilisation**
The chance fusion of one gamete with another, creating many possible genotype combinations.

**Mutation**
A change in DNA sequence that can create a new allele.

**Allele**
An alternative version of a gene.

## 4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

| Prompt | Your answer |
| --- | --- |
| Main concept | |
| Important example | |
| Common mistake to avoid | |
| How this links to the next lesson | |

## 5. Short Answer Questions

**1. Explain this lesson goal in your own words: "Major sources of genotype variation in sexually reproducing organisms.". Use one specific example from the lesson.**

BAND 3 2 MARKS

**2. Apply this idea to a new example: "That mutation is the source of new alleles.". Show your reasoning clearly.**

BAND 4 3 MARKS

**3. Analyse why this idea matters for understanding Sources of Genetic Variation - Meiosis, Crossing Over, Fertilisation, Mutation: "Why crossing over and independent assortment reshuffle existing alleles.".**

BAND 5 4 MARKS

## 6. Extend: Apply the Idea

BAND 5/6 5 MARKS

**A student gives a memorised answer about Sources of Genetic Variation - Meiosis, Crossing Over, Fertilisation, Mutation but does not use evidence or reasoning.**

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

## 7. Multiple Choice

**1.** What is the best first step when answering a question about Sources of Genetic Variation - Meiosis, Crossing Over, Fertilisation, Mutation?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

**2.** Which answer would show stronger understanding of Sources of Genetic Variation - Meiosis, Crossing Over, Fertilisation, Mutation?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

**3.** What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

## 8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

**SUCCESS CRITERION 1**

**Prove that you can: Major sources of genotype variation in sexually reproducing organisms.**

BAND 3 2 MARKS

**SUCCESS CRITERION 2**

**Prove that you can: That mutation is the source of new alleles.**

BAND 4 3 MARKS

**SUCCESS CRITERION 3**

**Prove that you can: Why crossing over and independent assortment reshuffle existing alleles.**

BAND 5 4 MARKS

**One thing I still need help with:**